Paper

How to Model an Engaging Online Quiz? The Emotion Modeling Approach

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Abstract—The article focuses on software technology used to provide a more engaging and exciting learning environment for students by introducing a variety of quizzes. Presently, quiz development can range from simple multiple-choice questions, true or false, drag-and-drop, dropdown menu selections, to 3D interactive techniques. This study introduces a systematic way of creating an engaging application using emotion modeling. Emotion models are being introduced in order to collect and model the systems' meaningful emotional needs. According to the findings, agent-oriented modeling is capable of modeling the emotional requirements of a system and of transforming these into a specific solution enabling to rapidly prototype an engaging system. A quantitative study has been performed on the novel approach to determine the feasibility of the proposed methodology in terms of analyzing, designing, and developing engaging applications.

Keywords—emotion modeling, agent-oriented modeling, learning technology.

1. Introduction

Learning methods such as online quizzes and massive open online courses (MOOCs) are being introduced to create a more engaging learning environments relied upon in teaching students [1]. Engagement a core principle of motivating learners, as it allows them to select a suitable topic [2], [3]. Without engagement, it will be difficult to absorb knowledge and complete courses relying on MOOCs or other similar applications [4]. The primary domains of learner engagement are cognitive, behavioral, and emotional [5]. Seeking additional information concerning the materials, preparing for completing quizzes, and a desire to learn are all indicators of cognitive engagement [6].

The level of contribution demonstrated by students performing classroom activities is referred to as behavioral engagement [5]. Emotional engagement refers to the students' emotional connections with institutions, teachers, peers, and MOOC material [7]. Positive and negative feelings are included in the emotional component.

To date, quizzes have evolved from simple multiple-choice questions [8], true or false, drag-and-drop [9], dropdown menu selections [9], to 3D interactive techniques [10]. Although lots of online quizzes have been introduced back in the days, those of the text-based or multimedia variety failed to engage the students.

How to develop an engaging online quiz? A technique for eliciting user emotional goals has yet to be found [11]. This may be due to the fact that emotion is a subjective and complex notion. Despite of that, in order for the application to be successful, the software developer must address the emotional needs of the users. Emotion modeling is necessary to capture what the users desire to feel, to ensure that all user concerns are addressed, to discover new requirements, to improve the system, and to reduce application failure and rejection rates [11], [12]. As a result, the suggested research was driven by a desire to incorporate emotion thinking into all phases of the development process, in order to reduce the complexity of designing an emotion-oriented application. Emotional modeling was chosen over other methodologies because it is utilized to address gaps in the original unified modeling language (UML), by extending agent-oriented modeling (AOM). The reason for this is that conventional software development approaches were primarily concerned with functional requirements in order to demonstrate system behavior. Unlike UML, which is excellent for modeling functional requirements, UML is incapable of dealing with the human factor.

AOM is an agent-oriented methodology that employs the concept of an agent at all stages of its execution via modeling steps [13]. In AOM, the interaction diagram depicts the interactions of agents (human or artificial) with the system [12]. AOM is useful for modeling a socio-technical system. AOM has been used in the Mauritius smart parking system [14], project-based ICT4D Education in the Field [15], and Digital Media Design [16].

This paper presents preliminary results of modeling an engaging online quiz through the agent-oriented approach. A systematic approach is introduced to create an engaging application through emotion modeling. A quantitative analysis of the novel approach is conducted to understand the feasibility of the proposed methodology. From the findings, AOM is able to model a non-functional requirement of a system and to transform it into a concrete model for rapid prototyping of an engaging system.